

Claims:

1. A watermarking system comprising:

a first detector for detecting a first scaling factor of an input watermarked image by detecting a first watermark from the input watermarked image, wherein the first watermark includes copy control information used for copy generation limitation;

a second detector for detecting a watermark including a second scaling factor from the input watermarked image; and

a controller controlling such that, when the second detector fails to detect the watermark including the second scaling factor, a second watermark including the first scaling factor is created and embedded into the input watermarked image and further an appended-type watermark is inserted into the input watermarked image to produce an output watermarked image having the first, second, and appended type watermarks therein.

2. The watermarking system according to claim 1, further comprising:

an appended-type watermark detector for detecting the appended-type watermark from the input watermarked image

based on a third scaling factor calculated from the first scaling factor and the second scaling factor,

wherein the controller controls such that, when the second detector has detected the watermark including the second scaling factor, the first and second scaling factors are used to calculate the third scaling factor.

3. The watermarking system according to claim 1, wherein the first detector searches for the first watermark while scaling the input watermarked image in steps of a predetermined small amount.

4. The watermarking system according to claim 2, wherein the third scaling factor is calculated by dividing the first scaling factor by the second scaling factor.

5. A watermark inserting method comprising the steps of:

a) detecting a first scaling factor of an input watermarked image by detecting a first watermark from the input watermarked image, wherein the first watermark includes copy control information used for copy generation limitation;

b) determining whether a watermark including a second scaling factor is detected from the input watermarked image;

c) when the watermark including the second scaling factor fails to be detected, creating a second watermark including the first scaling factor; and

5 d) embedding the second watermark and an appended-type watermark into the input watermarked image to produce an output watermarked image having the first, second, and appended-type watermarks therein.

6. The watermark inserting method according to claim 5, wherein the step a) comprises the steps of:

10 a.1) scaling the input watermarked image in steps of a predetermined small amount;

a.2) determining whether the first watermark is detected from a scaled input watermarked image; and

15 a.3) when the first watermark is detected from an input watermarked image scaled by a scaling factor, determining the scaling factor as the first scaling factor of the input watermarked image.

7. A watermark detecting method comprising the steps of:

20 a) detecting a first scaling factor of an input watermarked image by detecting a first watermark from the input watermarked image, wherein the first watermark includes copy control information used for copy generation limitation;

b) determining whether a watermark including a second scaling factor is detected from the input watermarked image;

c) when the watermark including the second scaling factor has been detected, calculating a third scaling factor from the first scaling factor and the second scaling factor; and

d) detecting an appended-type watermark from the input watermarked image based on the third scaling factor.

8. The watermark detecting method according to claim 7, wherein the step a) comprises the steps of:

a.1) scaling the input watermarked image in steps of a predetermined small amount;

a.2) determining whether the first watermark is detected from a scaled input watermarked image; and

a.3) when the first watermark is detected from an input watermarked image scaled by a scaling factor, determining the scaling factor as the first scaling factor of the input watermarked image.

9. The watermark detecting method according to claim 7, wherein the third scaling factor is calculated by dividing the first scaling factor by the second scaling factor.

10. A digital image recorder for recording an input watermarked image in a digital recording medium, comprising:

a first detector for detecting a first scaling factor of the input watermarked image by detecting a first watermark from the input watermarked image, wherein the first watermark includes copy control information used for copy generation limitation;

a second detector for detecting a watermark including a second scaling factor from the input watermarked image;

an appended-type watermark detector for detecting an appended-type watermark from the input watermarked image based on a third scaling factor calculated from the first scaling factor and the second scaling factor; and

a controller controlling such that, when the second detector fails to detect the watermark including the second scaling factor, a second watermark including the first scaling factor is created and embedded into the input watermarked image and further the appended-type watermark is inserted into the input watermarked image to produce an output watermarked image having the first, second, and appended-type watermarks therein, and, when the second detector has detected the watermark including the second scaling factor, the first and second scaling factors are used to calculate the third scaling factor.